

one-way altitude valve with delayed drawdown

(sizes 2" - 8")

installation, operating and maintenance instructions

model 3331-4

GENERAL DESCRIPTION

The OCV Model 3331-4 is designed to control the level in a storage tank or reservoir without the use of floats or other devices within the tank itself. It is an on-off valve that remains fully opened until the high level shutoff point is reached. In order to insure a more complete turnover of the water in the tank, the valve is equipped with an adjustable, delayed draw-down control that will not allow the valve to open until the tank level falls to a predetermined point.

The 3331-4 is designed to only fill the tank. Water is withdrawn from the tank either through a separate line, or through a simple check valve installed in parallel to the altitude valve.

The 3331-4 consists of the following components, arranged as shown on the schematic diagram:

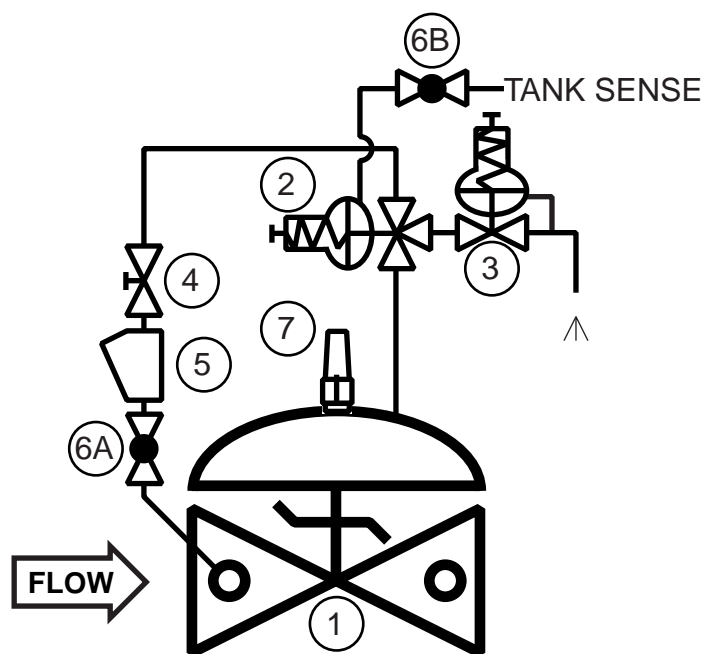
1. **Model 65 Basic Valve Assembly**, a hydraulically operated, diaphragm actuated, pilot controlled globe valve that closes with an elastomer-on-metal seal.
2. **Model 3300 Altitude Pilot**, a three-way control pilot that senses the tank head under its diaphragm and balances it against an adjustable spring load. Based on the actual tank head as compared to the set point, the pilot shifts to either vent or pressurize the main valve bonnet in order to open and close the valve.
3. **Model 1340 Pressure Reducing Pilot**, a two-way, normally open pilot that also se
3. **Model 141-2 Needle Valve** that controls the closing speed of the main valve.

4. **Model 159 Y-Strainer** that protects the pilot system from solid contaminants in the line fluid.
5. Two **Model 141-4 Ball Valves**, useful for isolating various parts of the pilot system for troubleshooting or repair.
6. **Model 155 Visual Indicator** that enables the user to determine the valve's operating position at a glance.

THEORY OF OPERATION

Operation of the 3331-4 is quite simple and can be readily understood by referring to the schematic diagram.

Tank head is sensed under the diaphragm of the alti-



tude pilot (2) through ball valve (5B). When the head falls below the set point, the pilot shifts to vent the diaphragm chambers of the main valve (1) to atmosphere. Line pressure forces the valve to the full open position. The tank begins to fill.

When the tank level rises to the high level shutoff point (set point), the altitude pilot shifts to connect inlet pressure to the main valve diaphragm chamber, forcing the valve fully and tightly closed.

INSTALLATION

The 3331-4 valve is furnished fully factory assembled except for the tank sense line. In areas where freezing temperatures are possible, the valve should be located in a vault below the frost line. The flow arrow on the name tag (located on the valve flange) should point *toward* the tank. As a further check, the spring barrel and adjusting screw of the altitude pilot will point *away from* the tank. See the Model 65 Basic Valve section of this manual for full details of valve installation.

Once the main valve is installed, the tank sense line must be connected at ball valve (5B). The proper installation of this sense line is critical to the efficient operation of the altitude valve. The following guidelines apply.

1. It is essential that the sense line be connected as close to the tank as possible in order to accurately sense the tank head. In most cases, the best location is the riser of an elevated tank or the wall of a ground storage tank. If this is not practical, connect the sense line to the fill pipe as close to the tank as possible. In extreme cases, the sense line may be connected at the discharge body side port of the main valve, but this should only be done if the valve itself is extremely close to the tank.
2. Minimum recommended size for the sense line is 1/2" OD tubing or 3/8" pipe.
3. In order to prevent air accumulation, the sense line should slope slightly upwards from the valve to the tank.
4. The 3331-4 vents its diaphragm chamber to atmosphere each time it opens. The volume varies according to valve size, as shown below. Provi-

sion should be made to drain off or otherwise dispose of this water.

| | | | |
|---------|----------|-----|-----------|
| 2": | .05 gal. | 4": | .20 gal.. |
| 2-1/2": | .06 gal. | 6": | .60 gal. |
| 3": | .10 gal | 8": | 1.5 gal. |

STARTUP AND ADJUSTMENT

The following details the full startup procedures for the Model 3331-4. Certain adjustments may not be necessary if the valve was preset at the factory. Nevertheless, the valve's operation should be closely monitored until the shutoff level is verified.

1. Loosen the jam nut on needle valve (3) and turn the adjusting screw fully **counterclockwise**.
2. Make sure ball valves (5A) and (5B) are open.
3. Open main line isolation valves as necessary to pressurize the valve and allow flow into the tank.
4. If the main valve does not open, turn the adjusting screw of the altitude pilot (2) **clockwise** until it does.
5. Let the tank fill. If the valve closes before the desired shutoff level is reached, repeat Step 4.
6. When the desired shutoff level is reached, turn the adjusting screw of the altitude pilot **counterclockwise** until the valve begins to close.
7. Observe that the valve closes fully. If the valve closes too quickly, slowly turn the adjusting screw of the needle valve (3) **clockwise** until the desired speed is attained. *CAUTION: Do NOT close the needle valve completely. To do so can prevent the valve from closing at all.*
8. Tighten the adjusting screw jam nuts on altitude pilot (2) and needle valve (3).

MAINTENANCE

Required maintenance of the 3331-4 is minimal. However, the following checks, periodically performed, will do much to keep the valve operating properly and efficiently.

1. Check for chipped or peeling paint.
2. Check for leaks at fittings and around flanges and connections. Tighten as required.
3. Check the screen of the Y-strainer for buildup of

solid material. Clean as required. This point is most important, as a clogged strainer can keep the valve from operating properly. On new installations, it is recommended that the strainer be checked every day or two until experience dictates a greater or lesser interval.

TROUBLESHOOTING

In the event of malfunction of the 3331-4, the following guide should enable the technician to isolate the cause of the problem and take appropriate corrective action.

MAIN VALVE FAILS TO OPEN

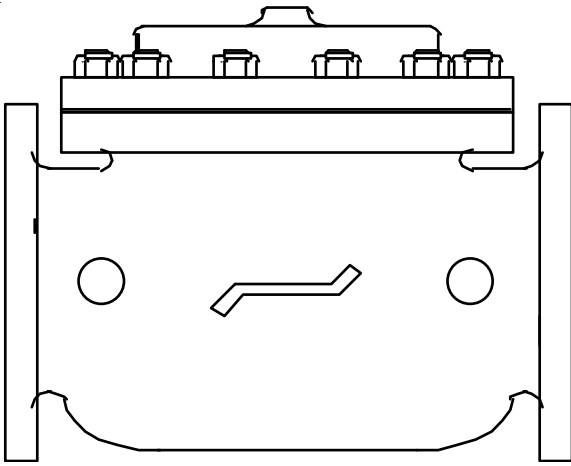
1. Make sure the level in the tank is down enough to call for valve opening. The amount of draw-down required is dependent on the spring used in the altitude pilot, hence on the tank height itself. This varies from approximately 2 feet on the lowest tanks, to approximately 6 feet on the highest.
2. Ball valve (5B) closed — Open as required.
3. Altitude pilot (2) adjusted too far counterclockwise — See Adjustment Instructions.
4. Carefully loosen a pipe plug on the main valve bonnet.
 - a) If water begins to discharge around the loosened plug, proceed to Step 5.
 - b) If no water discharges from the plug, proceed to Step 6.
5. Altitude pilot mechanism binding — Disassemble pilot and determine cause. See the 3300 Pilot section of this manual.
6. Main valve (1) stem binding — Disassemble valve and determine cause. See the Model 65 section of this manual.

MAIN VALVE FAILS TO CLOSE

1. Make sure that high level has been reached.
2. Ball valve (5A) closed — Open as required.
3. Ball valve (5B) closed — Open as required.
4. Strainer (4) clogged — Clean as required.
5. Needle valve (3) closed fully — Open as re-

quired. See Adjustment instructions.

6. Altitude pilot (2) adjusted too far clockwise — See Adjustment instructions.
7. Carefully loosen a pipe plug on the main valve bonnet.
 - a) If no water discharges around the loosened plug, proceed to Step 8.
 - b) If water discharges around the plug, proceed to Step 9.
8. Altitude pilot mechanism binding — Disassemble pilot and determine cause. See the 3300 Pilot section of this manual.
9. Temporarily close ball valve (5A).
 - a) If water continues to discharge around the loosened plug, the main valve diaphragm may be damaged. — Replace diaphragm. See the Model 65 section of this manual.
 - b) If the discharge stops, the main valve stem binding or there is an object trapped in the valve. — Disassemble main valve and determine cause. See the Model 65 section of this manual.



installation, operating, and maintenance instructions

series 65 basic control valve

GENERAL DESCRIPTION

The OCV Series 65 is a hydraulically-operated, diaphragm-actuated valve. It is available in either a globe (Model 65) or angle (Model 65A) configuration. The diaphragm is nylon-fabric bonded with synthetic rubber and forms a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. An elastomeric seat disc forms a tight seal with the valve seat when pressure is applied above the diaphragm.

FUNCTIONAL DESCRIPTION

Because the Series 65 is a hydraulically operated valve, it requires a minimum line pressure of approximately 5 psig in order to function. The valve functions on a simple principle of pressure differential. The line pressure at the inlet of the valve is bypassed through the pilot control piping to the diaphragm chamber of the valve. This pressure, together with the valve spring, works against the pressure under the valve seat. Because the effective area of the diaphragm is greater than that of the seat, the valve is held tightly closed. As the controlling pilot(s) allow the pressure to bleed off the diaphragm chamber, the two opposing pressures begin to balance and the valve will begin to open. The valve can be used to perform a simple on-off function, or with the proper pilot system, a modulating, or regulating function.

In cases where the line fluid is unusually dirty, or is otherwise unsuitable for operating the valve, an independent operating pressure source may be employed. The pressure available from such a source must be equal to, or greater than, line pressure.

INSTALLATION

In order to insure safe, accurate and efficient operation of the OCV control valve, the following list of checkpoints and procedures should be followed when installing the

valve.

1. Make a careful visual inspection of the valve to insure that there has been no damage to the external piping, fittings or controls. Check that all fittings are tight.
2. Thoroughly flush all interconnecting piping of chips, scale and foreign matter prior to mounting the valve.
3. Install the valve in the line according to the flow arrow on the inlet flange. The arrow should point downstream.
4. Allow sufficient room around the valve for ease of adjustment and maintenance service.

In addition, it is highly recommended that:

1. Isolation valves (eg., gate or butterfly) be installed on the inlet and discharge sides of the valve to facilitate isolating the valve for maintenance.
2. Pressure gauges be installed at the inlet and outlet sides of the valve to provide monitoring of the valve during initial start-up and during operation. The body side ports, if unused by the pilot system, provide a convenient connection for the gauges.
3. All valves larger than 6" be installed horizontally, i.e., with the bonnet pointed up, for ease of adjustment and maintenance servicing.

MAINTENANCE

The OCV control valve requires no lubrication and a minimum of maintenance. However, a periodic inspection should be established to determine how the fluid being handled is affecting the efficiency of the valve. In a water system, for example, the fluid velocity as well as the substances occurring in natural waters, such as dissolved minerals and suspended particles, vary in every installation. The effect of these actions or substances must be determined by inspection. It is recommended that an annual inspection, which includes ex-

amination of the valve interior, be conducted. Particular attention should be paid to the elastomeric parts, i.e., the diaphragm and seat disc. Any obviously worn parts should be replaced.

REPAIR PROCEDURES

In the event of malfunction of the OCV control valve, troubleshooting should be conducted according to the procedures outlined for the specific model of valve. Then, if those steps indicate a problem with the main valve, this section will outline the procedures necessary to correct the problem.

Problems with the main valve can be classed in three basic categories:

1. VALVE FAILS TO OPEN
 - a. Diaphragm damaged* - See Procedure A
 - b. Stem binding - See Procedure B
2. VALVE FAILS TO CLOSE
 - a. Diaphragm damaged* - See Procedure A
 - b. Stem binding - See Procedure B
 - c. Object lodged in valve - See Procedure B
3. VALVE OPENS AND CLOSES BUT LEAKS WHEN CLOSED
 - a. Seat disc damaged - See Procedure C
 - b. Seat ring damaged - See Procedure D

*A diaphragm failure can prevent the valve from either opening or closing, depending on the flow direction. Most water service valves flow "under the seat", in which case a diaphragm failure will keep the valve from closing. On the other hand, most fuel service valves flow "over the seat", in which case a diaphragm failure will keep the valve from opening. To determine which you have, examine the bridge mark cast into the side of the valve body, then compare it with the figures below.

PROCEDURE A : DIAPHRAGM REPLACEMENT

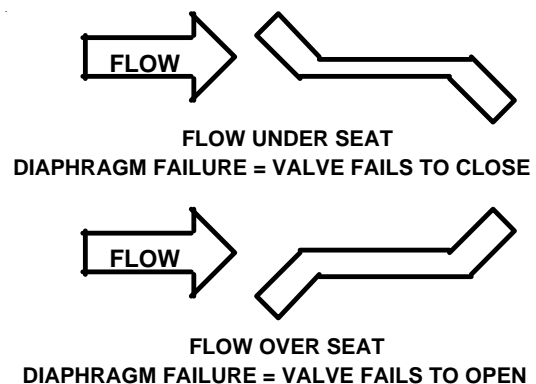
1. Isolate the valve from the system by closing upstream and downstream block valves.
2. Loosen one of the tubing connections on the bonnet. Allow any residual pressure to bleed off.
3. Remove all tubing connected at the bonnet.
4. Remove the bonnet nuts.
5. Remove the bonnet. If the bonnet sticks in place, it may be loosened by rapping sharply around its edge with a rubber-headed mallet. *NOTE: 8" and larger valves are equipped with eye bolts through which a chain can be fastened to aid in*

lifting the bonnet.

6. Remove the spring.
7. Remove the diaphragm plate capscrews and the diaphragm plate.
8. Remove the old diaphragm.
9. Making sure the dowel pin holes are in the proper location, place the new diaphragm over the studs and press down until it is flat against the body and spool.
10. Replace the diaphragm plate and the diaphragm plate capscrews.
11. Tighten all diaphragm plate capscrews snugly.
12. Replace the spring.
13. Replace the bonnet and reinstall the bonnet nuts.
14. Tighten the bonnet nuts snugly using a criss-cross tightening pattern.
15. Reinstall the control tubing.
16. Reopen the upstream and downstream block valves.
17. Before placing the valve back in service, perform the air bleed procedure described in the first section of this manual.

PROCEDURE B: CORRECTION OF BINDING STEM

1. Perform Steps 1 thru 6 of Procedure A, above.
2. Remove the spool assembly from the valve. *NOTE:*



On smaller valves, this can be accomplished simply by grasping the stem and pulling upward. Valves 6" and larger have the top of the stem threaded to accept an eyebolt to aid in lifting the spool out of the body. 6" thru 12" valves are threaded 3/8-16. 14" and 16" valves are threaded 5/8-11.

3. Carefully examine both ends of the stem for deep scratches, scoring or buildup of mineral deposits.

Polish the stem if necessary using a fine grade of emery cloth.

4. Similarly, examine and polish the upper bushing (in the bonnet) and the lower guide (in the seat ring).
5. Reinstall the spool assembly.
6. Reassemble the valve, following Steps 12 thru 17 in Procedure A.

PROCEDURE C: SEAT DISC REPLACEMENT

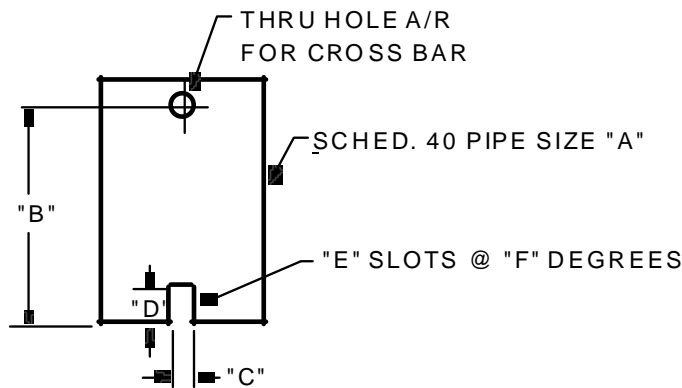
1. Perform Steps 1 and 2 of Procedure B, above.
2. With the spool assembly removed from the body, remove the seat retainer screws.
3. Slide the seat retainer off the lower end of the stem.
4. Remove the seat disc from its groove in the spool.
NOTE: The seat disc may fit quite tightly in the groove. If necessary, it may be pried out using a thin-bladed screwdriver or similar tool.
5. Install the new seat disc in the groove.
6. Reinstall the seat retainer and tighten the seat retainer screws.
7. Reassemble the valve, following Steps 5 and 6 of Procedure B.

PROCEDURE D: SEAT RING REPLACEMENT

NOTE: It is rare for a seat ring to require replacement. Minor nicks and scratches in the seating surface can usually be smoothed out with emery cloth.

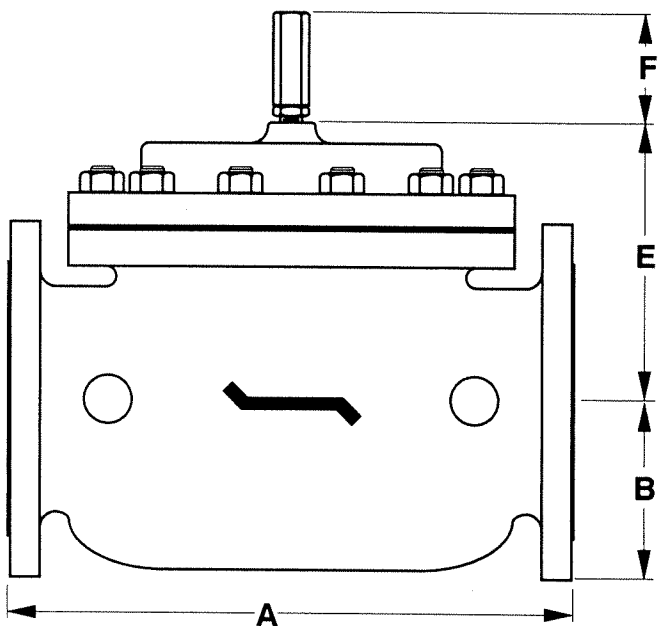
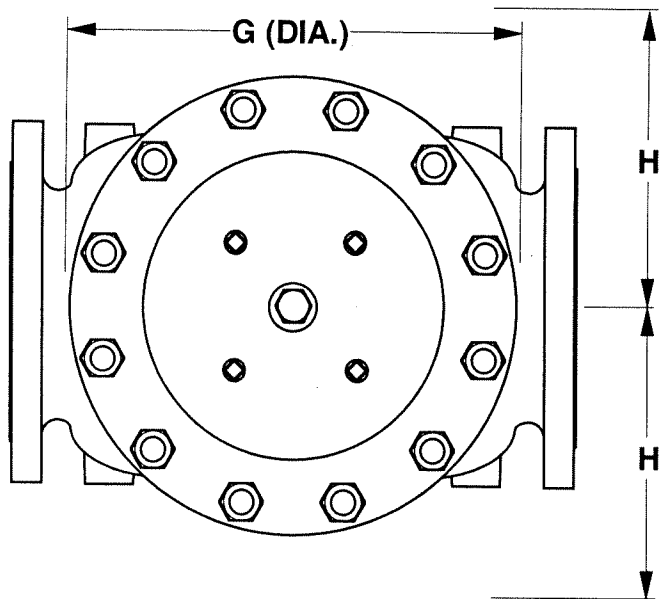
1. Perform Steps 1 and 2 of Procedure B, above.
2. If you are working on a 4" or smaller valve, follow Steps 3 thru 9, below.
3. If you are working on a 6" or larger valve, follow Steps 10 thru 16, below.

4. Seat rings in valves 4" and smaller are threaded into the valve body. To remove, you will need a special seat ring tool. You may fabricate one using standard pipe as shown in the sketch below, or one may be purchased from OCV.
5. Using the seat ring tool, unthread the seat ring from the body.
6. Remove the old o-ring from the counterbore in the body.
7. Install the new o-ring in the counterbore.
8. Using the seat ring tool, install the new seat ring.
9. Reassemble the valve, following Steps 5 & 6 of Procedure B.
10. Seat rings in valves 6" and larger are bolted into the body with socket head capscrews. In addition you will note that the seat ring is equipped with additional threaded holes that may be used for "jacking" the seat ring out of the body.
11. Remove the socket head capscrews.
12. Remove the old seat ring from the body by temporarily installing two or more of the capscrews in the "jacking" holes.
13. Install a new o-ring in the groove of the new seat ring. Lubricate the o-ring and outer seat ring wall with Vaseline® or similar lubricant.
14. Install the new seat ring in the body, making sure that the capscrew holes line up.
15. Replace and tighten all the capscrews.
16. Reassemble the valve, following Steps 5 and 6 of Procedure B.

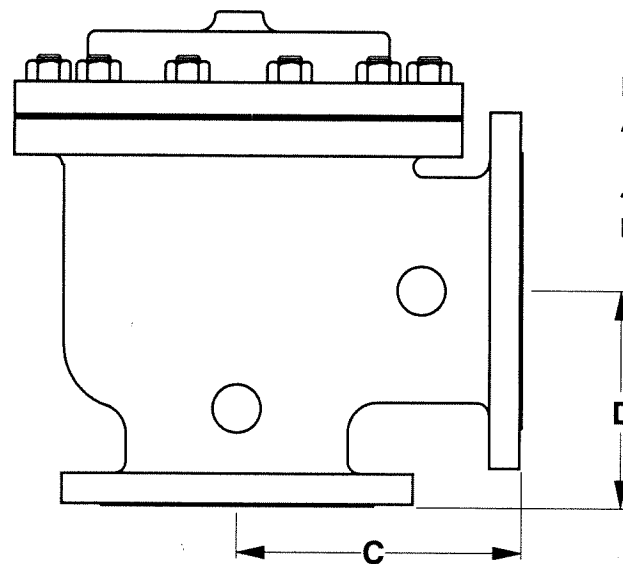


| VALVE SIZE | "A" PIPE SIZE | "B" MIN. LENGTH | "C" SLOT WIDTH | "D" SLOT DEPTH | "E" NO. OF SLOTS | "F" SLOT SPACING |
|------------|---------------|-----------------|----------------|----------------|------------------|------------------|
| 1-1/4" | 3/4" | 6" | 3/8" | 3/8" | 2 | 180° |
| 1-1/2" | 3/4" | 6" | 3/8" | 3/8" | 2 | 180° |
| 2" | 1-1/2" | 7" | 3/8" | 3/8" | 2 | 180° |
| 2-1/2" | 2" | 8" | 1/2" | 1/2" | 3 | 120° |
| 3" | 2-1/2" | 9" | 5/8" | 5/8" | 2 | 180° |
| 4" | 3" | 10" | 5/8" | 5/8" | 2 | 180° |

REVISED 3-17-97




| DIM | ANSI CLASS | VALVE SIZE | | | | | | | | | | | | |
|-----|------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 1 1/4 | 1 1/2 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 24 |
| A | S.E | 8.75 | 8.75 | 9.88 | 10.50 | 13.00 | - | - | - | - | - | - | - | - |
| | 150 | 8.50 | 8.50 | 9.38 | 10.50 | 12.00 | 15.00 | 17.75 | 25.38 | 29.75 | 34.00 | 39.00 | 40.38 | 62.00 |
| | 300 | 8.75 | 8.75 | 9.88 | 11.12 | 12.75 | 15.62 | 18.62 | 26.38 | 31.12 | 35.50 | 40.50 | 42.00 | 63.75 |
| B | SE | 1.44 | 1.44 | 1.69 | 1.88 | 2.25 | - | - | - | - | - | - | - | - |
| | 150 | 2.31 | 2.50 | 3.00 | 3.50 | 3.75 | 4.50 | 5.50 | 6.75 | 8.00 | 9.50 | 10.62 | 11.75 | 16.00 |
| | 300 | 2.62 | 3.06 | 3.25 | 3.75 | 4.12 | 5.00 | 6.25 | 7.50 | 8.75 | 10.25 | 11.50 | 12.75 | 18.00 |
| C | SE | 4.38 | 4.38 | 4.75 | 6.00 | 6.50 | - | - | - | - | - | - | - | - |
| | 150 | 4.25 | 4.25 | 4.75 | 6.00 | 6.00 | 7.50 | 10.00 | 12.69 | 14.88 | 17.00 | - | 20.81 | - |
| | 300 | 4 3/8 | 4.38 | 5.00 | 6.38 | 6.38 | 7.81 | 10.50 | 13.19 | 15.56 | 17.75 | - | 21.62 | - |
| D | SE | 3.12 | 3.12 | 3.88 | 4.00 | 4.50 | - | - | - | - | - | - | - | - |
| | 150 | 3.00 | 3.00 | 3.88 | 4.00 | 4.00 | 5.50 | 6.00 | 8.00 | 11.38 | 11.00 | - | 15.69 | - |
| | 300 | 3.25 | 3.25 | 4.12 | 4.38 | 4.38 | 5.81 | 6.50 | 8.50 | 12.06 | 11.75 | - | 16.50 | - |
| E | ALL | 6.00 | 6.00 | 6.00 | 7.00 | 6.50 | 7.92 | 10.00 | 11.88 | 15.38 | 17.00 | 18.00 | 19.00 | 27.00 |
| F | ALL | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 3.88 | 6.38 | 6.38 | 6.38 | 6.38 | 6.38 | 8.00 |
| G | ALL | 6.00 | 6.00 | 6.75 | 7.69 | 8.75 | 11.75 | 14.00 | 21.00 | 24.50 | 28.00 | 31.25 | 34.50 | 52.00 |
| H | ALL | 10.00 | 10.00 | 11.00 | 11.00 | 11.00 | 12.00 | 13.00 | 14.00 | 17.00 | 18.00 | 20.00 | 20.00 | 28.50 |



NOTE: 3" VALVE DIMENSIONS ARE FOR NEW MODEL 3100

4" VALVE DIMENSIONS ARE FOR NEW MODEL 4400

REV. A SDJ 6-6-02
REV. B SDJ 2-3-03

| | | | |
|---|-----------------|---|------------------------------|
| TOLERANCES | |  OCV Control Valves TULSA, OKLAHOMA U.S.A. | |
| UNLESS NOTED FRACTIONAL $\pm 1/64$ DECIMAL $\pm .005$ MACH. FINISH 125/ ANGULAR $\pm 1/2^\circ$ | | | |
| GENERAL VALVE DIMENSIONS | | | |
| DRAWN BY SDJ | DATE 10-6-97 | SIZE A | DRAWING NUMBER 65D |
| CHKD. BY | DATE | | REV. B |

altitude pilot

installation, operating, and maintenance instructions

model 3300

GENERAL DESCRIPTION

The OCV Model 3300 Altitude Pilot is a hydraulically-operated, diaphragm-actuated, three-way pilot valve. Used on a Model 65 Basic Valve, the 3300 is designed to control the level in an elevated tank or reservoir without the use of floats or electrical probes. The use of a large diaphragm area, a long spring and a hydraulically-balanced internal arrangement give this pilot the high sensitivity necessary for this application.

INSTALLATION

The 3300 is normally furnished factory-installed on the main valve; however, it can be field-mounted, either on the valve or remotely, if desired.

These are four connections on the pilot, as shown on the assembly drawing:

1. **3/8" NPT SENSING CONNECTION:** This connection provides the tank head sense to the diaphragm. It is extremely important that this connection be made so as to accurately sense the tank head at all times. The best possible location is the base of the riser itself. For maintenance and troubleshooting purposes, it is advisable that this line contain an isolation cock.
2. **3/8" SUPPLY CONNECTION:** This connection senses inlet (system) pressure to the main valve. Normally it is connected to the inlet side port of the main valve. It should also contain an isolation cock and should be protected by a strainer.

3. **1/2" CONNECTION TO BONNET:** This connection is made directly to the main valve bonnet of 8" and smaller valves. On 10" and larger valves, it is connected to the bonnet of a three-way auxiliary pilot.
4. **3/8" NPT VENT TO ATMOSPHERE:** This is exactly what the name applies—a **free** vent to atmosphere. Depending on the valve size, a certain amount of water will be discharged each time the valve opens, either from this vent or from the auxiliary pilot. Drain provisions should be provided for this water.

| VALVE SIZE | AMT. VENTED |
|-----------------|-------------|
| 1-1/4" & 1-1/2" | 2.5 oz. |
| 2" | 4.0 oz. |
| 3" | 10.0 oz. |
| 4" | 1.2 pints |
| 6" | 2.0 quarts |
| 8" | 1.0 gal. |
| 10" | 2.2 gal. |
| 12" | 3.5 gal. |
| 14" | 6.5 gal. |
| 16" | 8.6 gal. |

THEORY OF OPERATION

Understanding of the operation of the 3300 will be aided by referring to the assembly drawing. For convenience, the left end of the pilot will be referred to as "up," and the right end as "down."

The pilot is operated by tank head pressure, acting through the sensing connection to the lower side of the

diaphragm (12). There it is balanced by an adjustable spring force acting on the diaphragm assembly. As the tank level falls, the sensed head lessens, allowing the spring (13) to predominate, forcing the diaphragm assembly downwards. On the other hand, as tank level increases, the tank head gradually overcomes the spring, forcing the diaphragm assembly upwards.

Within the valve, there are three “chambers” to consider.

1. The drilled chamber inside the stem (8). This chamber is ported to the supply connection. Note that the stem can form a seal against the seat disc (32). This is referred to as the “inner seal.”
2. The annular chamber between the stem (8) and the seat (7). This chamber is ported to the bonnet connection. Note that the lower end of the seat can also form a seal against the seat disc (32). This is referred to as the “outer seal.”
3. The chamber below the stem and seat. This chamber is ported to the vent.

Now, as the diaphragm assembly moves downward, indicative of a falling tank head, the stem (8) is forced downwards, which first “makes” the inner seal between stem and seat disc (32), then “breaks” the outer seal between seat (7) and seat disc (32). Thus the bonnet chamber is connected to the vent chamber, and the main valve opens.

Conversely, as the diaphragm assembly moves upward, indicative of an increasing tank head, the stem (8) is forced upwards by spring (14) and spring (15). This first “makes” the outer seal between seat (7) and seat disc (32), then “breaks” the inner seal between stem (8) and seat disc (32). Thus the supply chamber is connected to the bonnet chamber, and the main valve closes.

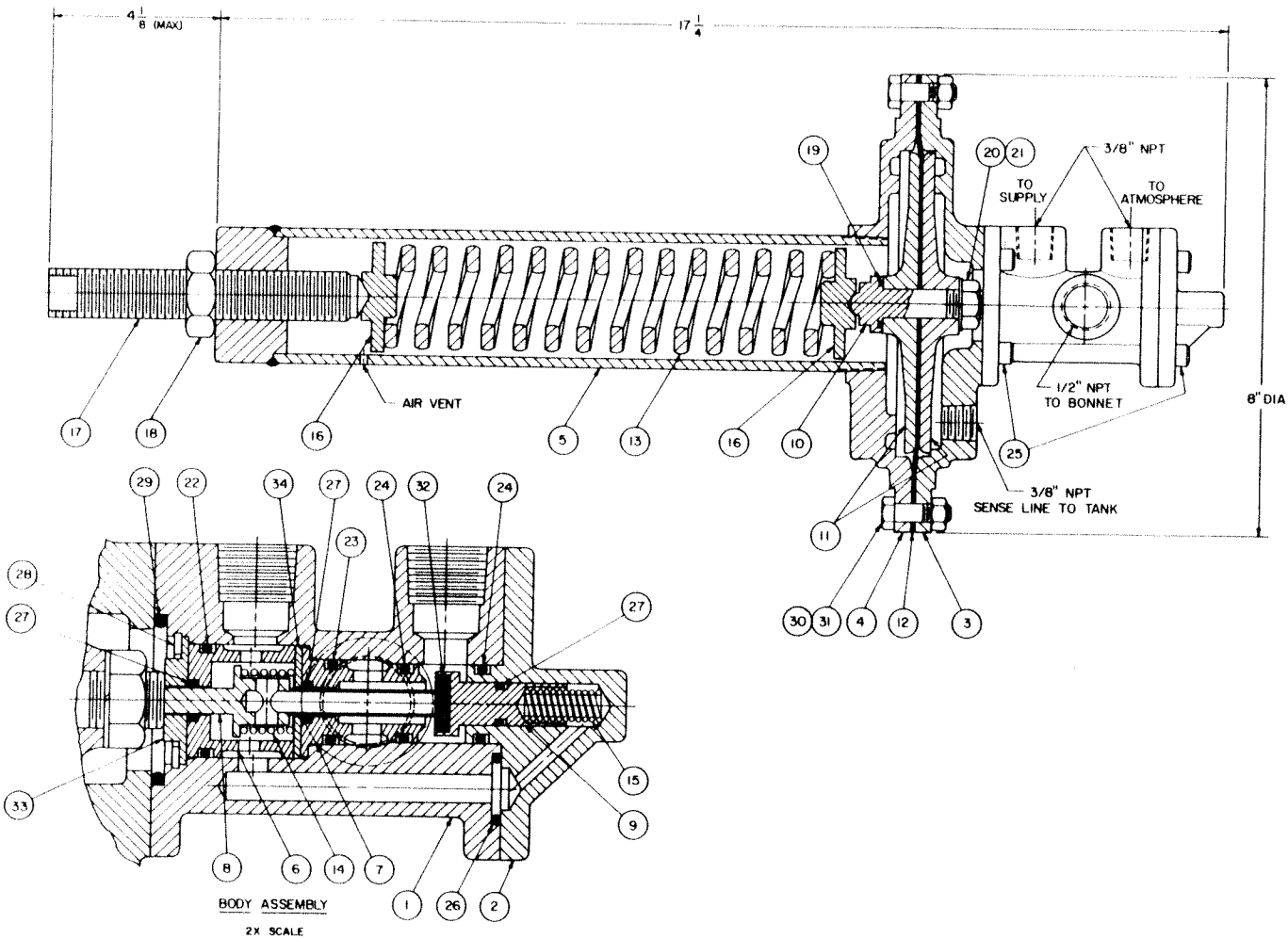
ADJUSTMENT

Initial adjustment of the 3300 is **always** a two-step process:

1. Turn the adjustment screw (17) clockwise until the valve opens. This is indicated by a sudden discharge of water from the vent line. Allow

the tank to fill. If the valve should close prematurely before the tank is full, turn the adjustment screw further clockwise until the valve reopens.

2. When the tank reaches the desired high level, turn the adjustment screw slowly counterclockwise until the valve starts closed. This is best determined by watching for a downward movement of the valve indicator stem.



NOTES

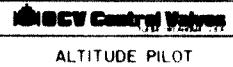
- 1 ▲ - RECOMMENDED SPARE PARTS
- 2 WHEN ORDERING PILOTS OR PARTS PLEASE SPECIFY:
 - (A) MODEL NUMBER
 - (B) WORKING PRESSURE AND TEMPERATURE
 - (C) HEIGHT OF TOWER OR TANK FROM CENTER LINE OF BASIC VALVE
 - (D) PART NUMBER
 - (E) QUANTITY
 - (F) DESCRIPTION
 - (G) MATERIAL

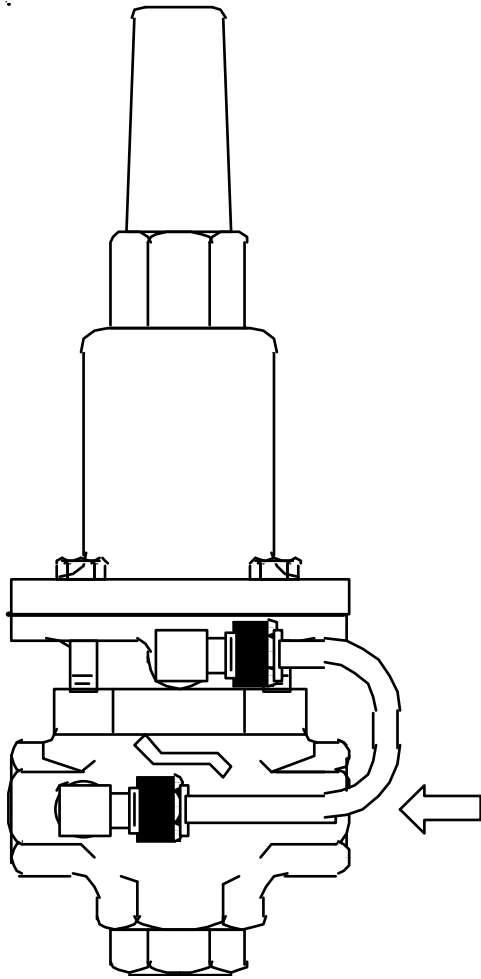
| | | | | | |
|----|--------|------------------------|---------------------|-----------|---------------|
| 34 | 300212 | SEAL RETAINER, SEAT | 1 | BRASS | |
| 33 | 300213 | SEAL RETAINER, BUSHING | 1 | BRASS | |
| ▲ | 32 | 694500 | SEAL DISC | 1 | BUNA-N |
| 31 | 531725 | CAPSCREW | 12 | STN. STL. | |
| 30 | 590725 | HEX NUT | 12 | STN. STL. | |
| ▲ | 29 | 600218 | O-RING | 1 | BUNA-N |
| ▲ | 28 | 630708 | SNAP RING | 1 | STN. STL. |
| ▲ | 27 | 611010 | O-RING | 3 | VITON |
| ▲ | 26 | 611111 | O-RING | 1 | VITON |
| ▲ | 25 | 530701 | CAPSCREW | 8 | STN. STL. |
| ▲ | 24 | 611112 | O-RING | 2 | VITON |
| ▲ | 23 | 611113 | O-RING | 1 | VITON |
| ▲ | 22 | 610117 | O-RING | 1 | BUNA-N |
| ▲ | 21 | 590711 | HEX NUT | 1 | STN. STL. |
| ▲ | 20 | 685703 | LOCKWASHER | 1 | STN. STL. |
| ▲ | 19 | 610017 | O-RING | 1 | BUNA-N |
| ▲ | 18 | 590037 | JAM NUT | 1 | CAD PL. STL. |
| ▲ | 17 | 300048 | ADJUSTING SCREW | 1 | CAD PL. STL. |
| ▲ | 16 | 300049 | SPRING RETAINER | 2 | CAD PL. STL. |
| ▲ | 15 | 651706 | SPRING | 1 | STN. STL. |
| ▲ | 14 | 651705 | SPRING | 1 | STN. STL. |
| ▲ | 13 | SPRING (SEE DATA) | 1 | STEEL | |
| ▲ | 12 | 694001 | DIAPHRAGM | 1 | BUNA-N, NYLON |
| ▲ | 11 | 308101 | DIAPHRAGM PLATE | 2 | BRONZE |
| ▲ | 10 | 300704 | SCREW, DIAPH. PLATE | 1 | STN. STL. |
| ▲ | 9 | 310702 | SEAL RETAINER | 1 | STN. STL. |
| ▲ | 8 | 314701 | STEM | 1 | STN. STL. |
| ▲ | 7 | 310724 | SEAT | 1 | STN. STL. |
| ▲ | 6 | 300211 | BUSHING, STEM | 1 | BRASS |
| ▲ | 5 | 300450 | SPRING BARREL | 1 | STEEL |
| ▲ | 4 | 304101 | BONNET, TOP | 1 | BRONZE |
| ▲ | 3 | 304121 | BONNET, BOTTOM | 1 | BRONZE |
| ▲ | 2 | 300135 | CAP, BOTTOM | 1 | BRONZE |
| ▲ | 1 | 302101 | BODY | 1 | BRONZE |

BODY ASSEMBLY
2X SCALE

| ← SPRING DATA | | | REVISIONS | | REF DWG NO'S |
|---------------|-----------------|------------|-----------|---|--------------|
| PART NO. | TANK HEIGHTS | COLOR CODE | E | D | C |
| 651404 | 5 TO 30 FEET | BLUE/GOLD | | | |
| 651405 | 20 TO 30 FEET | GOLD | | | |
| 651406 | 40 TO 80 FEET | BLUE | | | |
| 651407 | 70 TO 140 FEET | ORANGE | | | |
| 651410 | 130 TO 230 FEET | YELLOW | | | |

| MATERIAL | TOLERANCES | ITEM | PART NO. | DESCRIPTION | QTY. | MATERIAL |
|-------------|---------------|------------|----------|----------------|------|----------|
| NO REQ'D | DRAWN BY: RON | DATE: 8/84 | SEE | ALTITUDE PILOT | | |
| SCALE: FULL | CHKD BY: DATE | | D | 3300 | | B |





installation, operating, and maintenance instructions

pressure reducing pilot

model 1340

GENERAL DESCRIPTION

The Model 1340 Pressure Reducing Pilot is a normally-open, direct-acting, spring-loaded, diaphragm-type control pilot. As the primary control pilot for the OCV Series 127 control valves, it is designed to maintain a constant preset discharge pressure from the main valve. It is a constant throttling device, maintaining precise, positive control of the main valve.

The 1340 may also be used by itself as a downstream pressure regulator.

The 1340 is available in bronze or stainless steel construction and with 3/8 NPT or 1/2 NPT end connections.

The 1340 is available with four different adjustment ranges:

| | |
|-----------|-------------|
| 5-30 psi | 65-180 psi |
| 20-80 psi | 100-300 psi |

FUNCTIONAL DESCRIPTION

The 1340 controls the pressure in the diaphragm chamber of the main valve, hence the degree of opening or closing of the valve. The downstream pressure is sensed under the diaphragm of the pilot and is balanced against

an adjustable spring load. As the downstream pressure decreases below the set point, the pilot opens wider, decreasing the pressure in the diaphragm chamber of the main valve, opening the valve a proportionate amount. Conversely, as downstream pressure increases above the set point, the pilot closes further, increasing the pressure in the diaphragm chamber of the main valve, closing the valve a proportionate amount. The net result is a constant modulating action of the pilot and main valve, keeping the downstream pressure at the set point within very close limits.

INSTALLATION AND ADJUSTMENT

The 1340 is normally installed in the main valve control piping between the ejector and the downstream body tap. Flow must be in the direction indicated. In most cases, a sense line is factory installed between the diaphragm sense port and the downstream pilot body side port, as shown in the drawing. The pilot can also be remote sensed by running a line (typically 1/4" O.D. tubing) from the 1/8 NPT connection under the pilot diaphragm to the desired downstream point where the pressure control is desired.

Pressure adjustment is made by means of the single adjusting screw:

Clockwise adjustment **increases** downstream pressure.

Counterclockwise adjustment **decreases** downstream pressure.

MAINTENANCE

Required maintenance of the 1340 is minimal. Fittings and bolts should be periodically checked, and the body should be inspected for damage or excessive buildup of foreign material.

TROUBLESHOOTING

Other than improper adjustment, there are basically only three malfunctions which can occur with the 1340 pilot. These, and the symptoms they can cause, are as follows:

1. **PILOT DIAPHRAGM RUPTURED:** Results in failure of the main valve to close and/or downstream pressure that is too high. A ruptured pilot diaphragm will be evidenced by leakage through the vent hole in the pilot bonnet.
2. **PILOT SEAT DISC DETERIORATED:** Results in a downstream pressure that drifts too high under dead-end (zero flow) conditions.
3. **PILOT STEM BINDING:** Typically results in poor pressure control, though in extreme cases, it can result in failure of the main valve to open or close.

REPAIR PROCEDURES

Refer to the 1340 assembly drawing for parts identification.

A. DIAPHRAGM REPLACEMENT

1. Prior to disassembling the pilot, turn the adjusting screw (10) fully counterclockwise until it is loose enough to be turned with the fingers.
2. Remove the four bonnet capscrews (17).
3. Remove the bonnet (2). Set the spring (9) and spring retainers (11) aside in a safe place.
4. Remove the plug (4) from the bottom of the pilot.
5. Using a 7/16" socket as a backup on capscrew (12), remove hex nut (16), lockwasher (22), upper diaphragm plate (8) and o'ring (20).
6. Remove old diaphragm (5).

7. Inspect both diaphragm plate o'rings (20). Replace if necessary.
8. Place new diaphragm on stem (7).
9. Replace upper diaphragm plate (8), o'ring (20), lockwasher (22) and hex nut (16). Tighten securely.
10. Reinstall plug (4).
11. Hold spring (9) and spring retainers (11) together in the proper orientation, and insert them into the bonnet (2).
12. Place the bonnet over the adapter, and insert the bonnet capscrews (17). Tighten securely.
13. Place valve back in service, following the startup and adjustment procedures given in the main portion of this manual.

B. SEAT DISC REPLACEMENT

1. Follow Steps 1 through 4 under DIAPHRAGM REPLACEMENT, above.
2. Using a 7/16" socket as a backup on capscrew (12), remove hex nut (16), lockwasher (22), diaphragm plates (8) and o'rings (20).
3. Remove stem (7) and seat disc (12) through bottom of pilot.
4. Remove capscrew (12), seal washer (13) and old seat disc (6).
5. Place new seat disc, new seal washer and capscrew (12) on stem. Tighten securely.
6. Reinsert stem through bottom of pilot.
7. Reinstall diaphragm plates (8), o'rings (20), diaphragm (5), lockwasher (22) and hex nut (16). Tighten securely.
8. Reassemble pilot following Steps 10 through 13 under DIAPHRAGM REPLACEMENT, above.

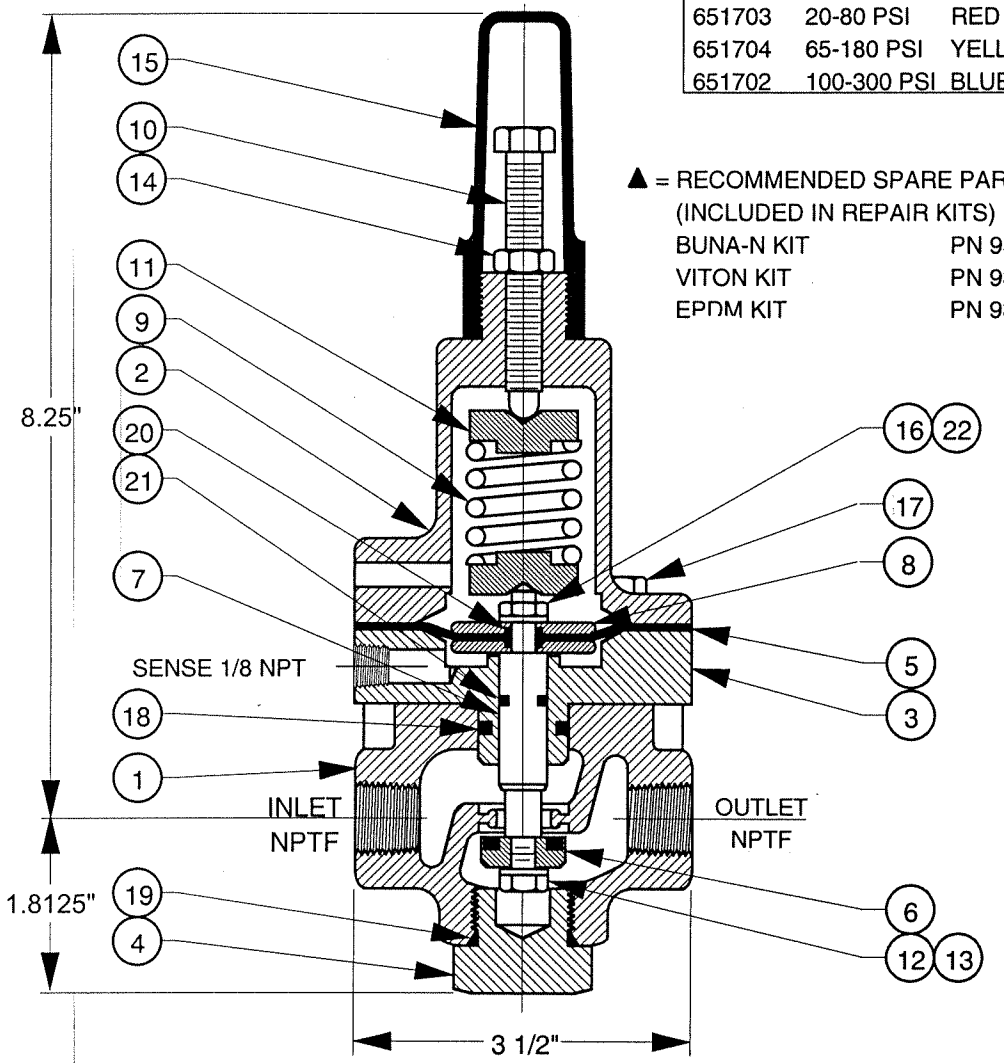
C. STEM REPAIR

1. Follow Steps 1 through 3 under SEAT DISC REPLACEMENT, above.
2. Inspect stem and o'ring (21) carefully.
3. Remove any foreign material or light scratches from the stem with a fine grade of emery cloth. A badly scored stem should be replaced.
4. Replace o'ring (21).
5. Lubricate the o'ring and stem liberally with Vaseline® or similar lubricant.
6. Reassemble pilot following Steps 6 through 8 under SEAT DISC REPLACEMENT, above.

| SPRING CHART | | | |
|--------------|-------------|--------|--|
| 651701 | 5-30 PSI | GREEN | |
| 651703 | 20-80 PSI | RED | |
| 651704 | 65-180 PSI | YELLOW | |
| 651702 | 100-300 PSI | BLUE | |

▲ = RECOMMENDED SPARE PARTS
(INCLUDED IN REPAIR KITS)

| | |
|------------|-----------|
| BUNA-N KIT | PN 930000 |
| VITON KIT | PN 930100 |
| EPDM KIT | PN 930400 |



| ITEM | PART NO | QTY | DESCRIPTION | MATERIAL |
|------|---------|-----|-------------------|----------------|
| 1 | 302102 | 1 | BODY | 3/8" NPTF |
| | 302104 | | | 1/2" NPTF |
| | 302702 | | | 3/8" NPTF |
| | 302704 | | | 1/2" NPTF |
| 2 | 304102 | 1 | BONNET | BRONZE |
| | 304702 | | | STN STEEL |
| 3 | 300129 | 1 | ADAPTOR | BRONZE |
| | 300719 | | | STN STEEL |
| 4 | 692502 | 1 | PLUG | ZINC PLTD STL |
| | 310730 | | | STN STEEL |
| 5 | 694002 | 1 | DIAPHRAGM | BUNA-N / NYLON |
| | 694102 | | | VITON / NYLON |
| | 694016 | | | EPDM / NYLON |
| 6 | 310703 | 1 | SEAT DISC | BUNA-N / SS |
| | 310709 | | | VITON / SS |
| | 310707 | | | EPDM / SS |
| 7 | 314704 | 1 | STEM | STN STEEL |
| | 314004 | | | MONEL |
| 8 | 308102 | 2 | DIAPHRAGM PLATE | BRASS |
| | 308702 | | | STN STEEL |
| 9 | CHART | 1 | SPRING | STN STEEL |
| 10 | 300700 | 1 | ADJUSTING SCREW | STN STEEL |
| 11 | 300134 | 2 | SPRING RETAINER | BRASS |
| | 300729 | | | STN STEEL |
| 12 | 531700 | 1 | HEX HEAD CAPSCREW | STN STEEL |
| 13 | 685760 | 1 | LOCKWASHER | STN STEEL |
| 14 | 590717 | 1 | HEX NUT | STN STEEL |
| 15 | 692002 | 1 | CAP | PVC |
| 16 | 590712 | 1 | HEX NUT | STN STEEL |
| 17 | 531701 | 4 | HEX HEAD CAPSCREW | STN STEEL |
| 18 | 611116 | 1 | O-RING | VITON |
| | 614116 | | | EPDM |
| 19 | 610912 | 1 | O-RING | BUNA-N |
| | 611912 | | | VITON |
| | 914912 | | | EPDM |
| 20 | 611010 | 2 | O-RING | VITON |
| | 614010 | | | EPDM |
| 21 | 611012 | 1 | O-RING | VITON |
| | 614012 | | | EPDM |
| 22 | 685700 | 1 | LOCKWASHER | STN STEEL |

| CHG | E.C. NO. | DATE | BY | REVISIONS | REF DWG NO'S |
|-----|----------|------|----|-----------|--------------|
| | | | | | |
| | | | | | |
| | | | | | |

| MATERIAL | TOLERANCES |
|-----------|--|
| NOTED | UNLESS NOTED FRACTIONAL ±1/64 DECIMAL ±.005 MACH. FINISH 125 ✓ ANGULAR ±1/2° |
| NO. REQ'D | DRAWN BY DATE RON 2-15-96 |
| SCALE 1/2 | CHKD. BY DATE |

MOORE Control Valves TULSA, OKLAHOMA U.S.A.

**MODEL 1340 PILOT 3/8"-1/2" NPTF
PRESSURE REDUCING**

| | | |
|----------|----------------|------|
| SIZE | DRAWING NUMBER | REV. |
| A | 1340 | |

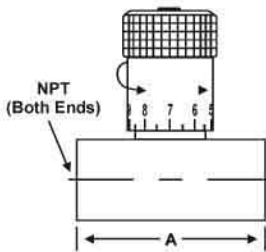
DESCRIPTION

The Model 141-2 Needle Valve is an adjustable restriction device installed in the control circuit tubing. The setting of the needle valve meters the flow into and out of the main valve diaphragm chamber, thus controlling the response speed of the main valve. Depending on the application, the needle valve may be used as a closing speed control, opening speed control, or both simultaneously.



◀ Needle Valves shown
Sizes: 3/4" & 1/4"

MODEL 141-2 MATRIX

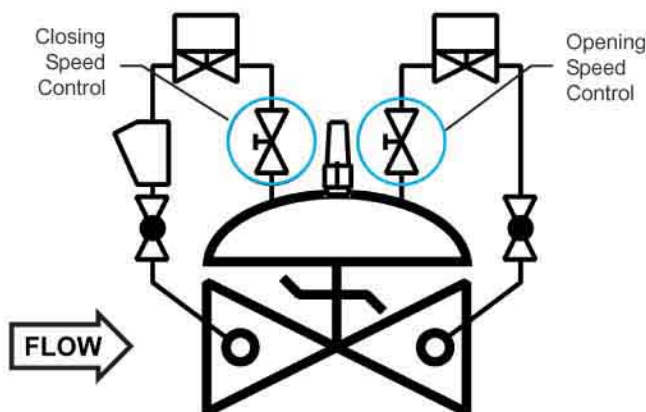
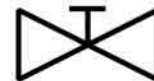


| MATERIAL | PART NUMBER | INLET/OUTLET (NPT) | A | USED ON VALVE SIZE* |
|------------|-------------|--------------------|-------|---------------------|
| Brass | 683100 | 1/4 | 2 | 1 1/4"-2" |
| Brass | 683101 | 3/8 | 2 1/4 | 2 1/2"-6" |
| Brass | 683102 | 1/2 | 2 5/8 | 8"-10" |
| Brass | 683103 | 3/4 | 3 1/4 | 12"-16" |
| Stn. Steel | 683700 | 1/4 | 2 | 1 1/4"-2" |
| Stn. Steel | 683702 | 3/8 | 2 1/4 | 2 1/2"-6" |
| Stn. Steel | 682704 | 1/2 | 2 5/8 | 8"-10" |
| Stn. Steel | 683703 | 3/4 | 3 5/8 | 12"-16" |

Note: Needle valve size may vary on valve application. Consult factory.

SCHEMATIC SYMBOL

The Model 141-2 Needle Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 115-3 DIGITAL VALVE as separate opening and closing speed controls.



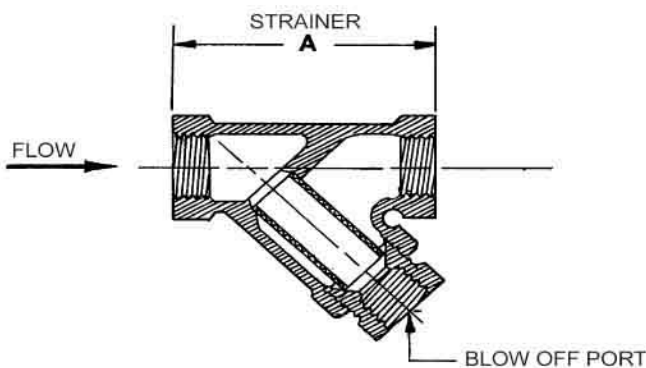
DESCRIPTION

MODEL 159 Y-STRAINER

The 159 Y-Strainer installs in the inlet piping of the pilot system and protects the pilot system from solid contaminants in the line fluid. It is the standard strainer for water service valves.

MODEL 159 Y-STRAINER MATRIX

| MATERIAL | PART NUMBER | INLET/OUTLET (NPT) | BLOW OFF PORT (NP) | A | STD. MESH | USED ON VALVE SIZE |
|------------|-------------|--------------------|--------------------|---------|-----------|--------------------|
| Bronze | 660100 | 3/8 | 3/8 | 2 11/16 | 24 | 1 1/4"-6" |
| Bronze | 660101 | 1/2 | 3/8 | 2 5/8 | 24 | 8"-10" |
| Bronze | 660102 | 3/4 | 3/8 | 3 5/16 | 24 | 12"-16" |
| Stn. Steel | 660700 | 3/8 | 1/4 | 2 1/2 | 20 | 1 1/4"-6" |
| Stn. Steel | 660701 | 1/2 | 1/4 | 2 1/2 | 20 | 8"-10" |
| Stn. Steel | 660702 | 3/4 | 1/4 | 3 1/8 | 20 | 12"-16" |



MATERIALS

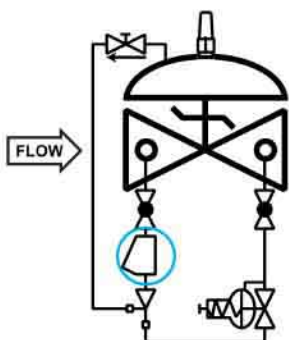
Bronze, ASTM B62
Optional mesh sizes: 50, 100

Stainless Steel, CF8-M (316)
Optional mesh sizes: 60, 80, 100

Screens are stainless steel

SCHEMATIC SYMBOL

The Model 159 Y-Strainer is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 127-3 Pressure Reducing Valve

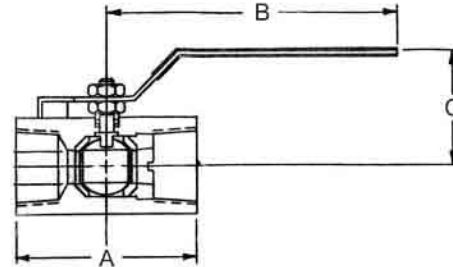
MAINTENANCE

Routine cleaning and checking of the Y-Strainer will aid in keeping the control valve functioning properly. Pilot system isolation ball valves are supplied on valves equipped with the Model 159 Y-Strainer. These allow flushing of the screen through the blow off port, or removal of the screen itself for manual cleaning.

DESCRIPTION

The Model 141-4 Ball Valve is a ¼-turn shutoff device used for isolating the pilot system from the main valve. They are extremely useful for performing routine maintenance and troubleshooting.

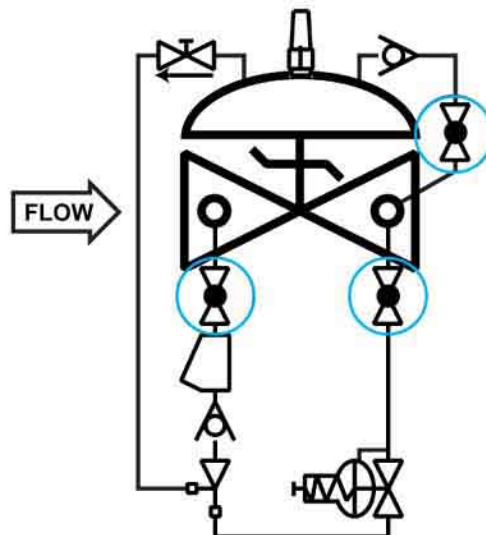
Ball valves are standard on water service valves; optional on fuel service valves.



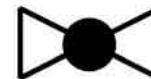
MODEL 141-4 MATRIX

| MATERIAL | PART NUMBER | INLET/OUTLET (NPT) | A | B | C | USED ON VALVE SIZE* |
|------------|-------------|--------------------|-------|-------|-------|---------------------|
| Bronze | 680100 | 3/8 | 1 3/4 | 3 1/2 | 1 7/8 | 1 ¼"-6" |
| Bronze | 680101 | 1/2 | 2 | 3 1/2 | 2 1/4 | 8"-10" |
| Bronze | 680102 | 3/4 | 3 | 4 3/4 | 2 1/4 | 12"-16" |
| Stn. Steel | 680700 | 3/8 | 2 | 3 3/4 | 2 1/8 | 1 ¼"-6" |
| Stn. Steel | 680701 | 1/2 | 2 1/4 | 3 3/4 | 2 1/2 | 8"-10" |
| Stn. Steel | 680702 | 3/4 | 3 | 4 3/4 | 2 1/4 | 12"-16" |

SCHEMATIC SYMBOL



The Model 141-4 Ball Valve is shown on OCV Valve Schematics as:



EXAMPLE: Shown here on a MODEL 127-4 Pressure Reducing / Check Valve.

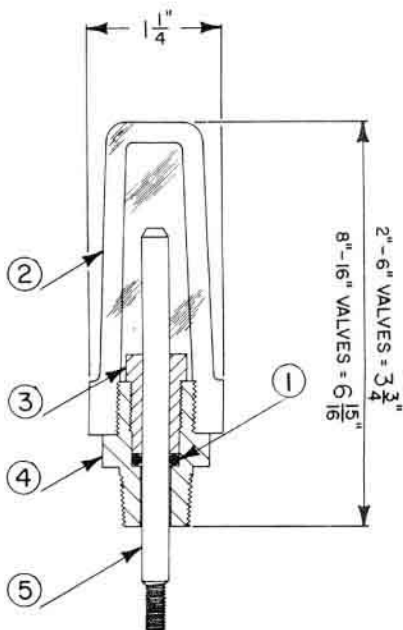
DESCRIPTION

The Model 155 Visual Indicator is a device that enables the user to determine the extent of opening of a control valve. It consists of an adaptor threaded into the center port of the valve bonnet, a rod threaded into the main valve stem, a sealing O-ring, and a protective clear plastic housing. The indicator rod moves as the valve opens and closes. It may be installed on virtually any OCV control valve, and can be done so without any disassembly of the valve itself.

WHERE USED - Standard on Series 94 Check Valves, Series 3330 Altitude Valves, and Series 22 Digital Control Valves. Optional on any other valve not employing a limit switch or position transmitter.



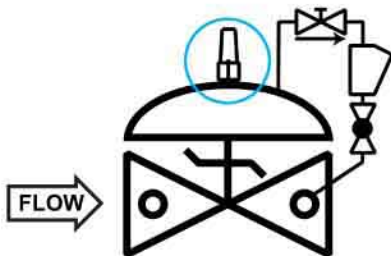
MODEL 155 MATRIX



| MATERIAL | PART NO. (BRASS ADAPTOR) | PART NO. (STAINLESS ADAPTOR) | VALVE TRAVEL (FULL STROKE) |
|-----------------|--------------------------|------------------------------|----------------------------|
| 1 1/4" - 1 1/2" | 255100 | 255700 | 3/8" |
| 2" | 255100 | 255700 | 1/2" |
| 2 1/2" | 255100 | 255700 | 3/4" |
| 3" | 255100 | 255700 | 1" |
| 4" | 255101 | 255701 | 1 3/8" |
| 6" | 255102 | 255702 | 1 1/2" |
| 8" - 10" | 255103 | 255703 | 2 1/2" |
| 12" | 255104 | 255704 | 3" |
| 14" - 16" | 255105 | 255705 | 3 1/2", 4" |
| 24" | 255109 | 255709 | 6" |

| ITEM | DESCRIPTION |
|------|-------------|
| 1 | O-Ring |
| 2 | Housing |
| 3 | Bushing |
| 4 | Adaptor |
| 5 | Stem |

SCHEMATIC SYMBOL



EXAMPLE: Shown here on a Model 94-1 Check Valve

The Model 155 is shown on OCV Valve Schematic as:



MATERIALS

- Indicator Rod: Monel
- Adapter: Brass (std.), Stainless Steel (optional)
- Housing: Butyrate (1 1/4" - 6") Acrylic (8" and larger)
- O-Ring: Viton® (std.) Buna-N, EPDM (optional)

Valve Position Indicator 155